

# SNI

STANDAR NASIONAL INDONESIA

SNI 07 - 3081 - 1992

UDC 621 - 643 : 669 - 1

---

## DUCTILE IRON PIPES AND ACCESSORIES FOR NON-PRESSURE PIPE-LINES



**Note:**

Translation without guarantee  
In the event of any doubt arising, the original  
standard in Indonesian is to be evidence

Based on the proposal of the Ministry of Industry this standard  
was approved by the Standardization Council of Indonesia - DSN  
to be the National Standard of Indonesia - SNI  
with the following number

SNI 07 - 3081 - 1992

## CONTENTS

	Page
1. SCOPE .....	1
2. DEFINITION .....	1
3. MANUFACTURING METHOD .....	1
4. QUALITY REQUIREMENTS .....	1
5. SAMPLING METHOD .....	5
6. TEST METHOD .....	6
7. MARKING .....	7



## **DUCTILE IRON PIPES AND ACCESSORIES FOR NON-PRESSURE PIPE-LINES**

### **1. SCOPE**

- 1.1. This standard covers definition, manufacturing method, quality requirements, sampling method, test method and marking of ductile iron pipes and accessories for non-pressure pipe-lines.
- 1.2 This standard defines the dimensions of pipes used in the construction of non-pressure pipe-lines.

### **2. DEFINITION**

Ductile iron, also called nodular iron, is characterized by the presence of spheroidal graphite.

### **3. MANUFACTURING METHOD**

This standard comprises a general specification completed by specific requirements applicable to:

- 3.1 Ductile iron pipes manufactured by any one of the following four processes:
  - a. Centrifugal casting in lined or unlined metal moulds
  - b. Centrifugal casting in sand.
  - c. Casting in sand moulds.
  - d. Casting in metal moulds.
- 3.2 Ductile iron accessories manufactured by either of the following two processes:
  - a. Welding.
  - b. Casting in sand moulds or metal moulds.

It is applicable to pipes and accessories for sewerage pipelines and drains. The range of sizes extends from DN 100 to DN 2600 inclusive.

Note: The nominal size (DN) is defined in ISO 6708.

### **4. QUALITY REQUIREMENTS**

#### **4.1 Visual properties**

- a. After casting, iron pipes and accessories for pipe-lines may, if necessary, be subjected to a suitable heat treatment to endow with the required mechanical properties.
- b. Pipes and accessories shall not have any defects likely to be detrimental to their use.
- c. Pipes and accessories showing small imperfections, unavoidable in the method of manufacture and in no way detrimental to use, shall not be rejected.



- d. With the prior approval of the purchaser, the manufacturer may repair slight surface imperfections in appearance.
- e. With the prior approval of the purchaser or the purchaser's representative, the repair of certain defects may be carried out using any well-tried method such as welding for example. In this case, the purchaser may possibly require one of the tests given below to be carried out.

#### 4.2 Types of joints

The pipes and accessories may be supplied with different types of joints. The specification mainly concerns pipes with sockets for joints with elastomer gaskets. It may also be used for pipes and accessories having other types of joints, for example flanged joints, welded joints, saddle junctions.

Note : The standard external diameter of the spigot end of pipes and accessories is the same for all types of joints. Furthermore, this external diameter is the same as that specified in ISO 2441-1975: Ductile Iron Pipes and Accessories For Pressure Pipe lines.

#### 4.3 Dimension

The standard working lengths of socket pipes are shown in Table I.

**Table I**

Nominal Size DN	Standard working length IN
DN < 500	4 – 5 – 5,5 – 6
600 < DN < 2600	4 – 5 – 5,5 – 7 – 8 – 9

#### 4.4 Tolerances

##### 4.4.1 Tolerances on length

Of the total number of socket pipes to be supplied in each diameter, the manufacturer may supply up to 10% in lengths shorter than the standard working lengths specified, the maximum permissible reduction in length being given in Table II.

**Table II**

Dimension in meters

Specified length L	Maximum reduction in length
$L \leq 400$	1
$4 \leq L \leq 6$	2
$6 < L$	3

#### 4.4.2 Tolerances on Straightness

When the pipes are rolled along two gantries separated by approximately two-thirds of length  $L$  of the pipes, the maximum deviation  $f_m$ , in millimetres, shall not be greater than 1,25 times the length  $L$ , in metres, of this pipe i.e.:  
 $f_m \leq 1,25 L$ .

#### 4.4.3 Tolerances on Masses

The value of masses of the sockets appearing in table VIII are approximate. The masses of pipes corresponding to each type of joint shall be specified in national standards or, when not so specified, in manufacturer's catalogues; these shall be calculated by taking the density of cast iron as 7050 kg/m<sup>3</sup>. The mass of pipe for each working length shown in table VIII has been calculated taking into account in each case a socket mass fixed by a linear formula.

The values indicated for the mass per metre of pipes and the masses of the sockets are rounded off to the nearest 0,1 kg.

The values indicated for the total masses of pipes are rounded off :

- to the nearest 0,5 kg for masses of less than 100 kg.
- to the nearest 1,0 kg for masses above 100 kg.

The tolerances on the standard masses are given in Table III.

**Table III**

Type of casting	Tolerance on Standard mass %
Centrifugally cast pipes:	
– $\leq$ DN 200	$\pm 8$
– $<$ DN 200	$\pm 5$
Non-centrifugally cast pipes	$\pm 8$
Welded accessories	$\pm 12$
Cast accessories	$\pm 12$

Note – Castings of mass greater than the maximum shall be accepted provided that they comply in every other respect with the requirements of this Standard.

#### 4.4.4 Tolerances on joints

In order to ensure interchangeability between supplies of different origins, the plus tolerance on the external diameters of the spigot ends of pipes and accessories, measured on the circumference at right angles to the joint, shall



not be greater than 1 mm.

#### 4.4.5 Tolerances on thickness

**Table IV**

Dimension in millimeters

Type of casting	Tolerance
Centrifugally cast pipes	$-(1,3 + 0,001 \text{ DN})^{1)}$
Non-centrifugally cast pipes and accessories for pipe-lines	$-(2,3 + 0,001 \text{ DN})^{1)}$

1) No limit for the plus tolerances has been set.

The tolerances on wall thickness are as given in Table I, where DN is the nominal size.

#### 4.5 Calculation

The standard thickness of pipes and accessories shall be calculated as a function of the nominal diameter by the formula:

$$e = K (0,5 + 0,001 \text{ DN})$$

Where

e is the standard wall thickness in millimeters:

DN is the nominal size;

K is a coefficient selected from the sizes of integers ..... 7, 8, 9, 10, 11, 12 ..... depending on service conditions and manufacturing processes:

K = 7 for the pipes in table

K = 7 for accessories fabricated by welding

K > 7 for cast accessories

K = 12 or 14 for cast fittings as in ISO 2441-75

If necessary, each specification shall give an additional formula applicable to small diameter castings.

The external diameter of the pipes, expressed in millimeters, is fixed as a



function of the nominal diameter and independent of the thickness. Increases or decreases in the pipe wall thickness shall be obtained by modification of the actual internal diameter.

#### 4.6 Coatings

##### 4.6.1 Internal linings

Pipes shall be lined with a layer of cement mortar suitable for transportation of normal sewerage effluent.

##### 4.6.2 External coatings

Pipes shall be coated with the usual bitumen coating layer, reinforced, at the manufacturer's option, with a sub-layer of zinc or with a polyethylene liner according to the soil nature.

##### 4.6.3 Coatings for pipes of diameter over 600 mm

For pipes with a diameter greater than 600 mm, the reinforcement shall be applied for incursive soils.

Note – In case of exceptional incursivity of soils or effluents, special coatings may be applied.

### 5. SAMPLING METHOD

The manufacturer's mechanical test shall be carried out during manufacture. The mechanical acceptance test shall be carried out on castings grouped in batches as follows:

#### 5.1 Centrifugally cast pipes

Each batch shall be made up of pipes cast successively as follows:

- 200 pipes for DN 100 to 300 inclusive;
- 100 pipes for DN 350 to 600 inclusive;
- 50 pipes for DN 700 to 1000 inclusive;
- 25 pipes for DN 1200 to 2600 inclusive.

#### 5.2 Pipes and accessories not centrifugally cast

Castings made from iron of substantially the same composition and, if necessary, having been subjected to the same heat treatment, shall be considered as one batch. The size of such batches shall be limited to 4 ton of crude castings, excluding the mass of the risers.

The manufacturer shall take from one pipe (see a) or from one sample of each batch (see b) a test bar which shall satisfy the requirements of table V. A single casting is considered as one batch if the mass is 4 ton or more.

If the results of this test are below the specified minimum values, two other test bars shall be taken from the same pipe, or from the same sample in the case of accessories, and these shall satisfy the same specified requirements.



**Table V**

Type of casting	Minimum tensile strength $R_m$ N/mm <sup>2</sup>	Minimum 0,2% proof stress <sup>1)</sup> $R_{p0,2}$ N/mm <sup>2</sup>	Minimum elongation after fracture A (%)	
	DN 100 s/d 2600	DN 100 s/d 2600	DN 100 s/d 1000	DN 1200 s/d 2600
Non-centrifugally cast pipes, and accessories	420	300	10	7
Centrifugally cast pipes	400	300	5	5

1) The proof stress shall be measured only where there is a special agreement between the manufacturer and the purchaser and under condition which shall be specified on the order.

Note – The provisions made for the composition of batches and the heat treatment of the castings, the choice of a test bar diameter according to the thickness and the type of casting all contribute to the precision of this test.

## 6. TEST METHOD

### 6.1 Tensile tests

#### 6.1.1 Centrifugally cast pipes

The machined test bar for the tensile test shall be taken from the spigot end of the pipe. The choice of whether the test bar is taken parallel or at right angles to the pipe axis is left to the manufacturer. In case of dispute, sampling parallel to the pipe axis shall rule.

The test bar shall include a cylindrical part, the gauge length of which shall be at least five times its diameter.

**Table VI**

Dimensions in millimetres

Thickness of pipe, e	Diameter of test bar
$e < 6$	2.5
$6 \leq e < 8$	3.5
$8 \leq e < 12$	5.0
$12 \leq e$	6.0



### 6.1.2 Pipes not centrifugally cast and accessories for pipe-lines

The machined test bar for the tensile test shall be taken, at the choice of the manufacturer, either from a sample attached to the casting or cast separately. In the latter case, it shall be cast from the same iron and, if necessary, shall be subjected to the same heat treatment as the castings. The choice of the method used for casting the sample shall be left to the manufacturer. The thickness of the sample and the diameter of the bar are given in Table VII, dependent on the mean thickness of the casting.

**Table VII**

Dimension in millimetres

Mean thickness of casting	Thickness of sample	Diameter of test bar
< 12	12.5	6
≥ 12	25	12

The gauge length of the machined bar shall be at least five times its diameter. In all cases the ends of the test bars shall be such that they will fit the testing machine.

### 6.2 Brinell hardness test

The Brinell hardness test shall be carried out in accordance with SNI 19-0405-1989, with a steel ball of 10.5 or 2.5 mm diameter.

### 6.3 Leak - tightness test

#### 6.3.1 Spigot and socket pipes

Pipes shall be subjected to a works hydrostatic leaktightness test for a duration of at least 10 s using water at one bar pressure, without leaking.

#### 6.3.2 Accessories

Accessories shall be subjected to the same leak-tightness test with water as the pipes or to an equivalent test using air, without leaking.

## 7. MARKING

Each pipe or accessory shall bear at least the following marks:

- the manufacturer's mark;
- an indication that casting is of ductile iron;
- the nominal size (DN)

Pipes with a nominal size greater than DN 300 shall also bear the year of manufacture. These marks may be made by casting, painting or cold stamping.



Table VIII

Dimensions in millimetres

Masses in kilograms

Nominal diameter <i>DN</i>	Barrel			Socket mass (approximate)	Total mass (approximate for one standard working length L of:								
	DE	e	Linear mass (approximate)		2 m	3 m	4 m	5 m	5,5 m	6 m	7 m	8 m	9 m
100	118	5	12,5	4,3	—	—	54,5	67	73	79,5	—	—	—
125	144	5	15,4	5,7	—	—	67,5	82,5	90,5	98	—	—	—
150	170	5	18,3	7,1	—	—	80,5	98,5	108	117	—	—	—
200	222	5	24	10,3	—	—	106	130	142	154	—	—	—
250	274	5,3	31,5	14,2	—	—	140	172	188	203	—	—	—
300	326	5,6	39	18,6	—	—	177	217	237	257	—	—	—
350	378	6	49,4	23,7	—	—	221	271	295	320	—	—	—
400	429	6,3	59	29,3	—	—	265	324	354	383	—	—	—
500	532	7	81,4	42,8	—	—	368	450	491	531	—	—	—
600	635	7,7	107	59,3	—	—	487	594	648	701	808	—	—
700	738	8,4	135,7	79,1	—	—	522	758	825	893	1029	—	—
800	842	9,1	167,9	102,6	—	—	774	942	1026	1110	1278	1446	1614
900	945	9,8	203	129,9	—	—	942	1145	1247	1348	1551	1754	1957
1000	1048	10,5	241,3	161,3	—	—	1127	1368	1488	1609	1850	2092	2338
1200	1255	11,9	327,6	237,7	—	—	1548	1876	2040	2203	2531	2858	3186
1400	1462	13,3	426,7	279,3	—	—	1986	2413	2626	2840	3266	3693	4120
1600	1658	14,7	538,3	375,4	—	—	2529	3967	3336	3605	4144	4682	5220
1800	1875	16,1	662,9	490,6	—	—	2652	3806	4137	4468	5131	5794	6457
2000	2082	17,5	800,2	626,4	—	—	3827	4627	5028	5428	6228	7028	7828
2200	2288	18,9	949,8	784,2	—	—	4583	5533	6008	6483	7433	8383	9332
2400	2495	20,3	1112,6	966,2	—	—	5417	6529	7086	7642	8754	9867	10980
2600	2702	21,7	1289,2	1173,7	—	—	6327	7615	8259	8903	10191	11479	12768

8 from 8













**DEWAN STANDARDISASI NASIONAL - DSN**

Sekretariat : Sasana Widya Sarwono Lt. 5, Jln. Gatot Subroto 10, Jakarta 12710 Indonesia

Telp.: (021)5206574, 5221686 pes. 294, 296, 305, 450

Fax : 5206574, 5207226, 583467 Telex : 62875 PDII IA : 62554 IA

First Published, 1994